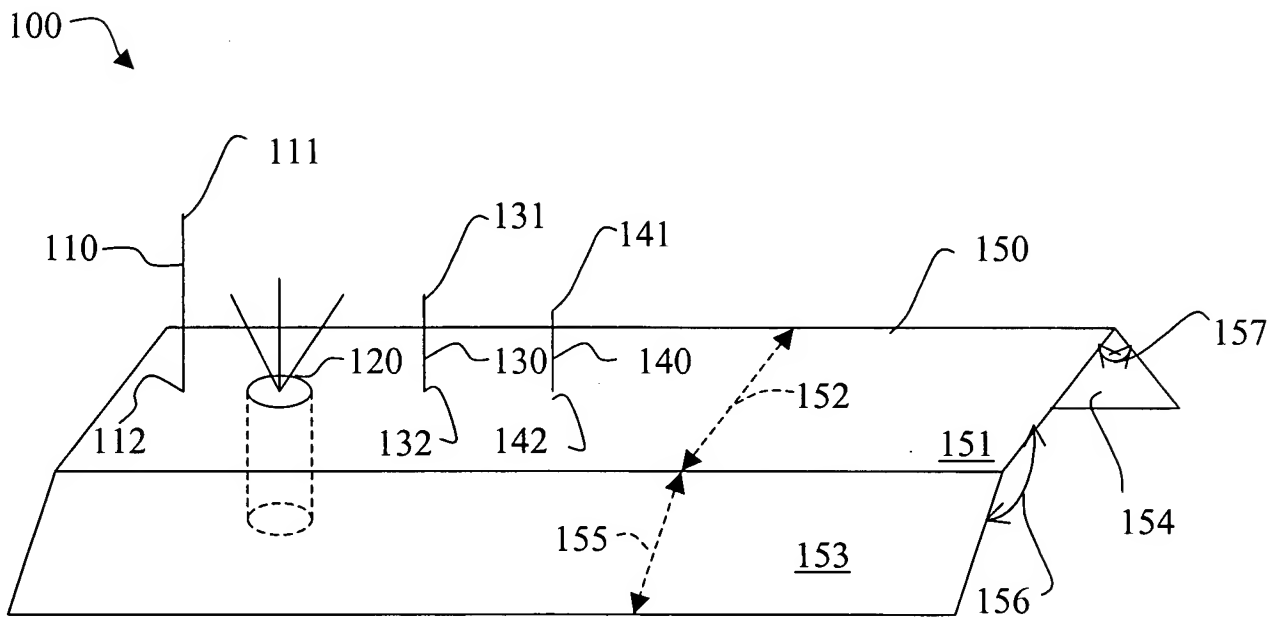
FIG. 1



4-element beam antenna
with a multi-polarized tri-element driver

FIG. 2

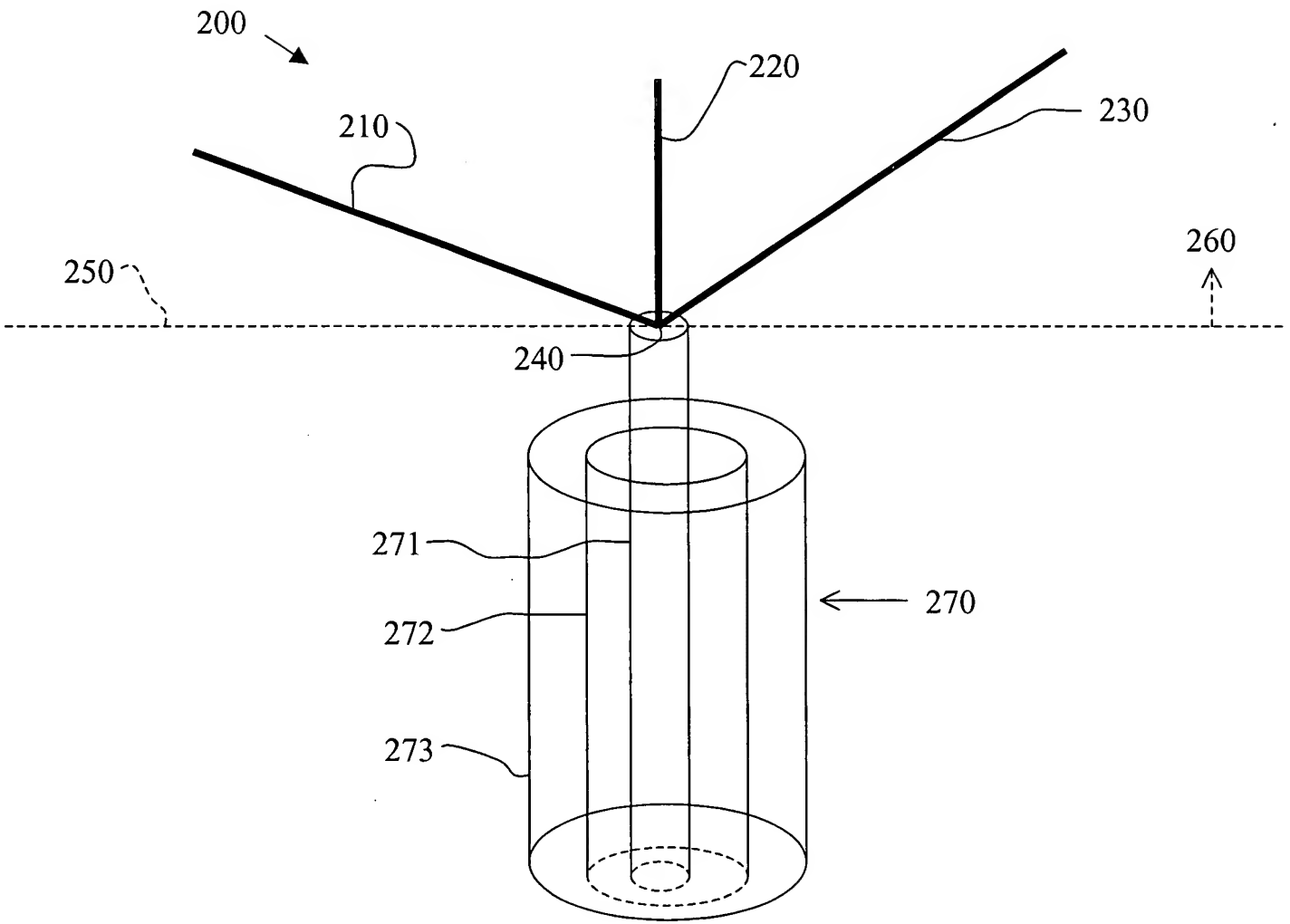


FIG. 3

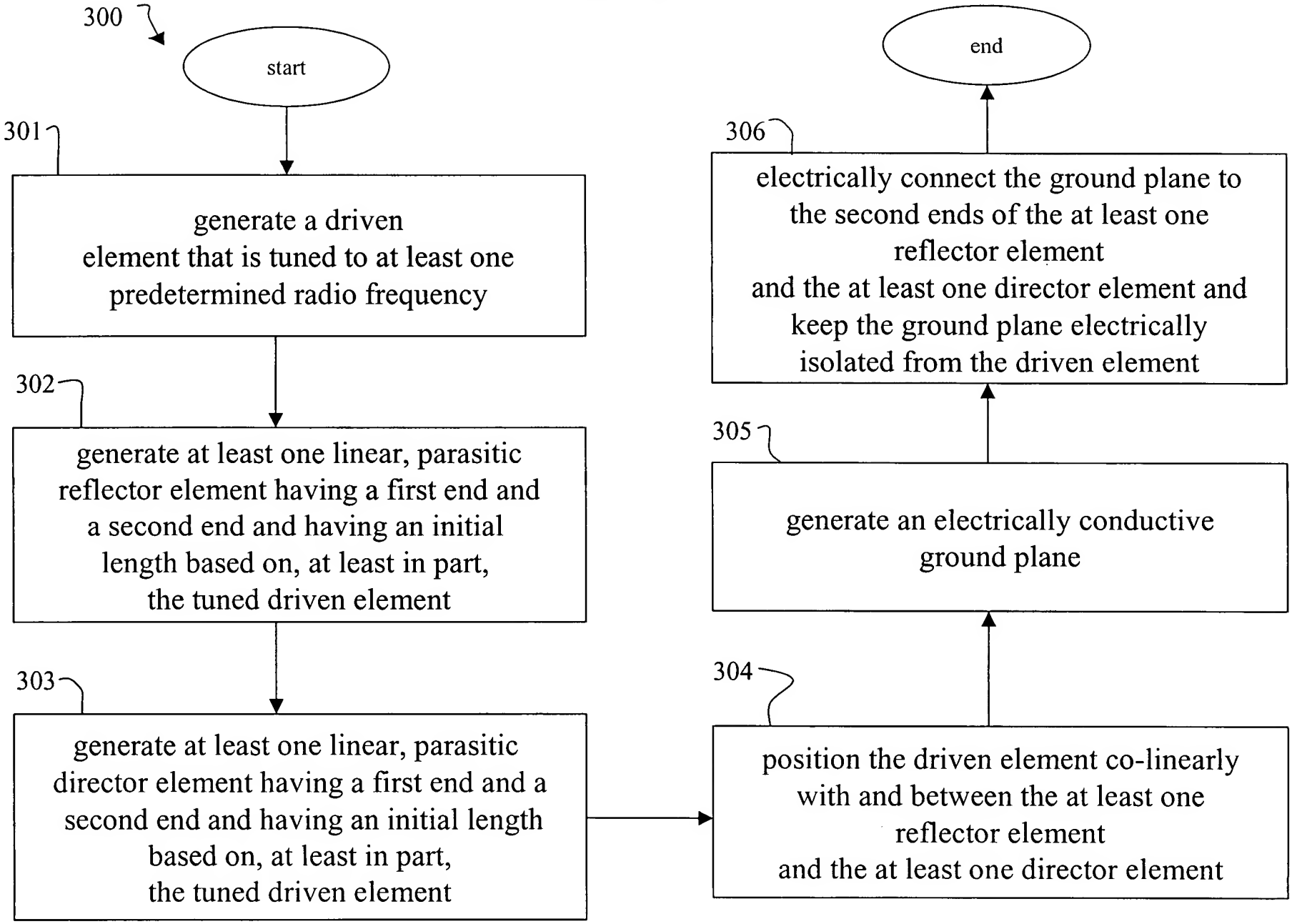
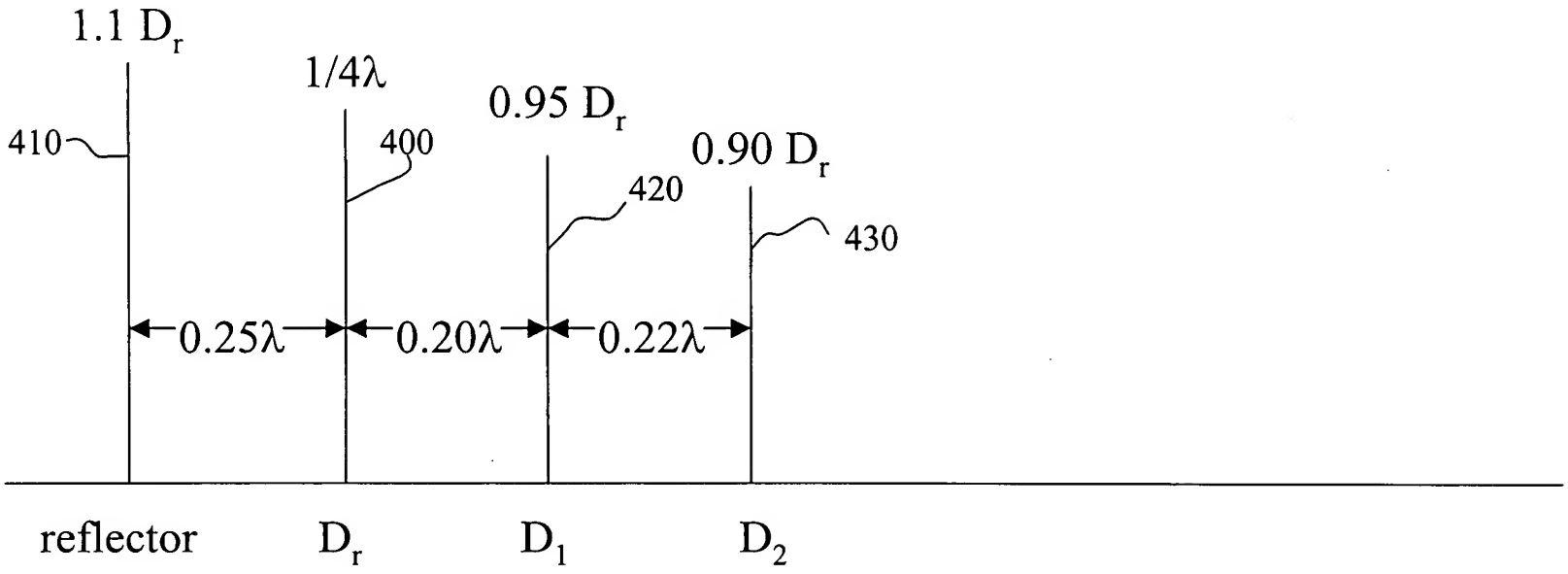

300
start
301
generate a driven element that is tuned to at least one predetermined radio frequency
302
generate at least one linear, parasitic reflector element having a first end and a second end and having an initial length based on, at least in part, the tuned driven element
303
generate at least one linear, parasitic director element having a first end and a second end and having an initial length based on, at least in part, the tuned driven element
304
position the driven element co-linearly with and between the at least one reflector element and the at least one director element
305
generate an electrically conductive ground plane
306
electrically connect the ground plane to the second ends of the at least one reflector element and the at least one director element and keep the ground plane electrically isolated from the driven element
end

FIG. 4
re-adjustment of antenna elements



$$D_{1(\text{adjusted})} = 0.95*[984/f(\text{MHz})]*(1/4)*(12)*(\text{k-factor}) * [1-[(1-P)_{\text{of } 0.45\lambda} * (1.1/0.95)]] * [1-[(1-P)_{\text{of } 0.20\lambda} * (1.0/0.95)]] * [1-[(1-P)_{\text{of } 0.22\lambda} * (0.9/0.95)]]$$

where $D_r = ¼*[984/f(\text{MHz})]*12 = 1/4\lambda$ in inches

FIG. 5

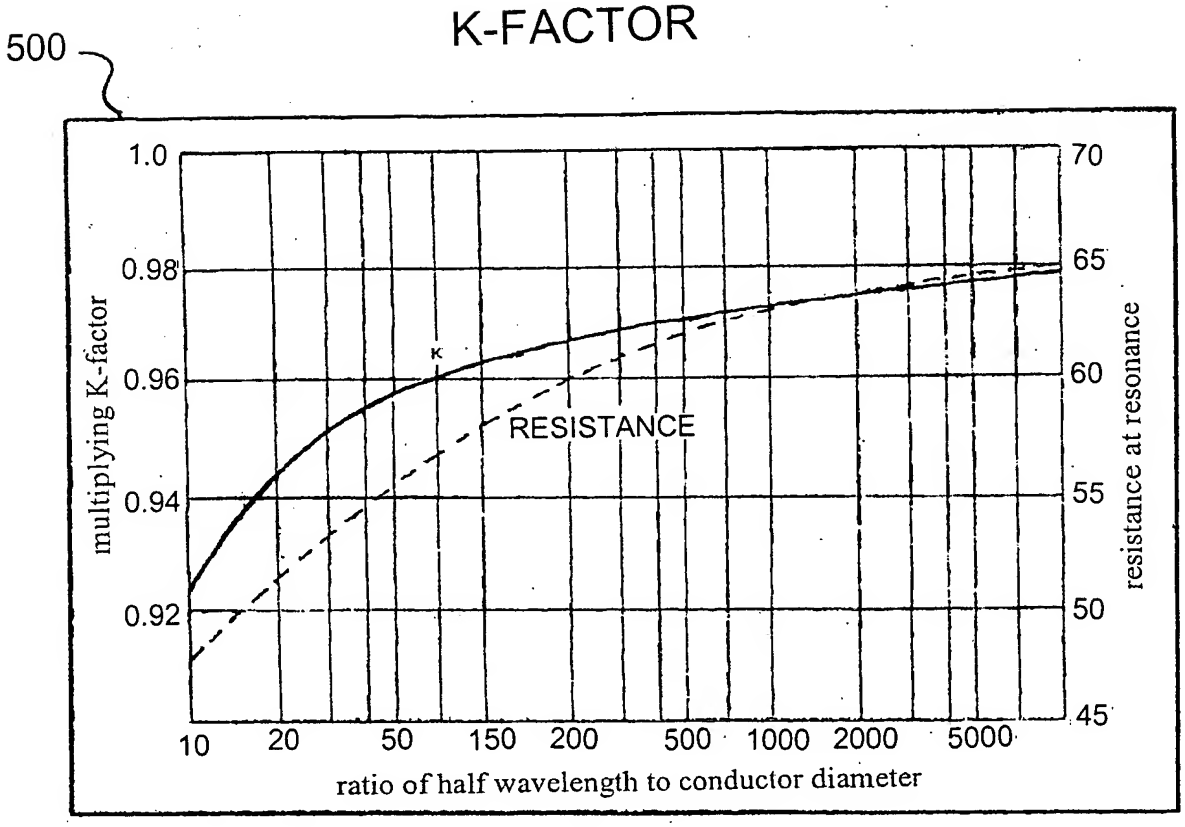

K-FACTOR
500
1.0
0.98
0.96
0.94
0.92
multiplying K-factor
K
RESISTANCE
70
65
60
55
50
45
resistance at resonance
10
20
50
150
200
500
1000
2000
5000
ratio of half wavelength to conductor diameter

FIG. 6

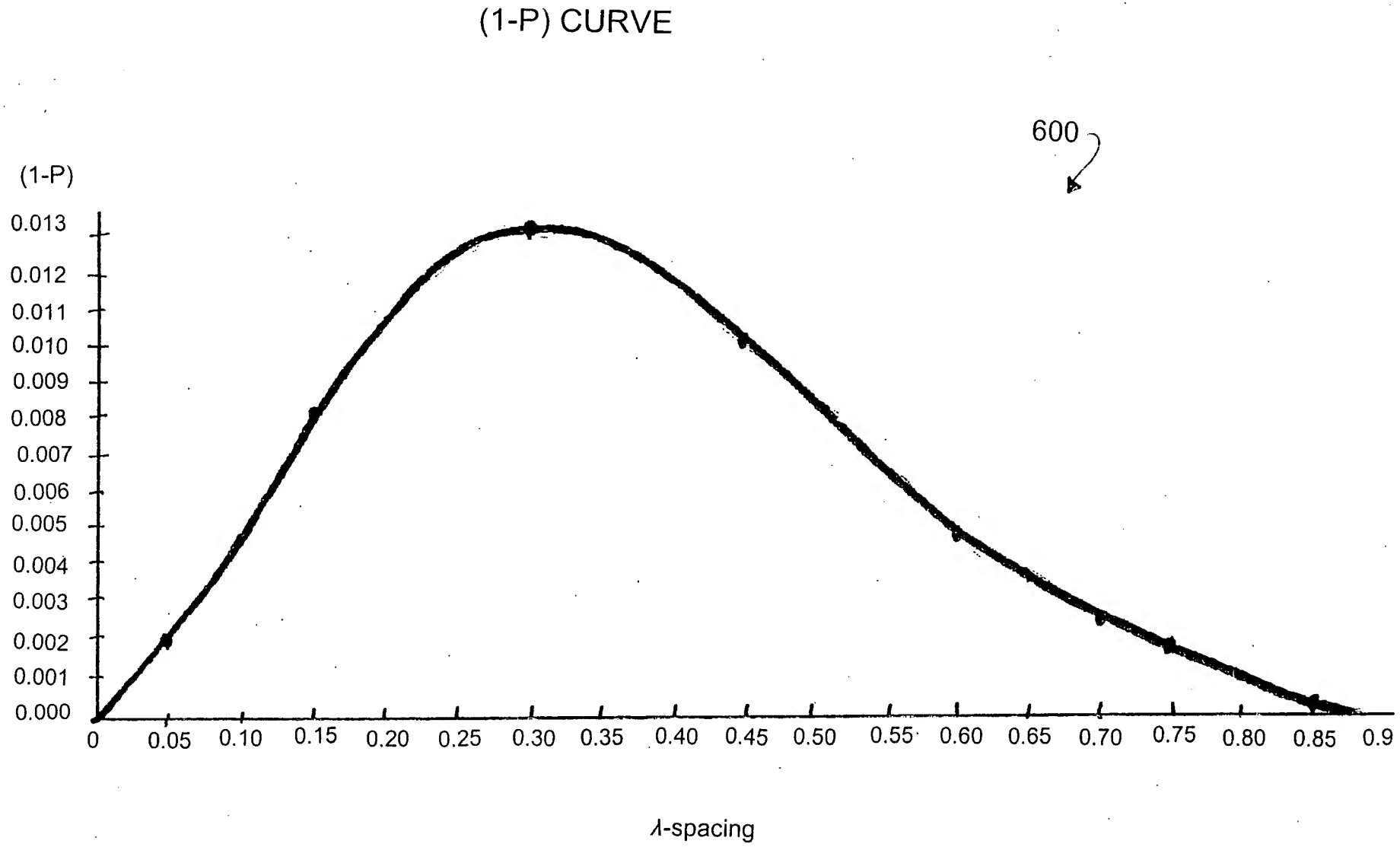

(1-P) CURVE
600
(1-P)
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0.000
0
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50
0.55
0.60
0.65
0.70
0.75
0.80
0.85
0.9
λ-spacing

FIG. 7

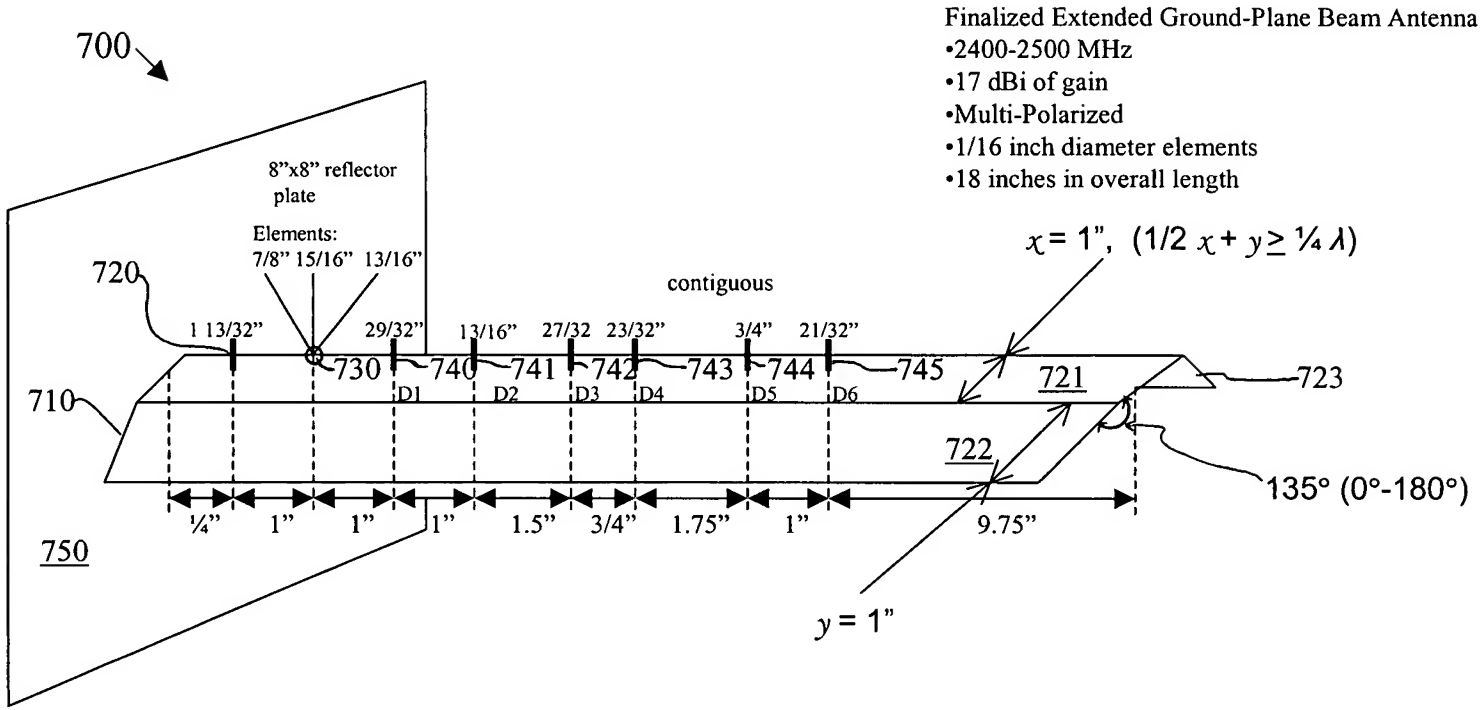
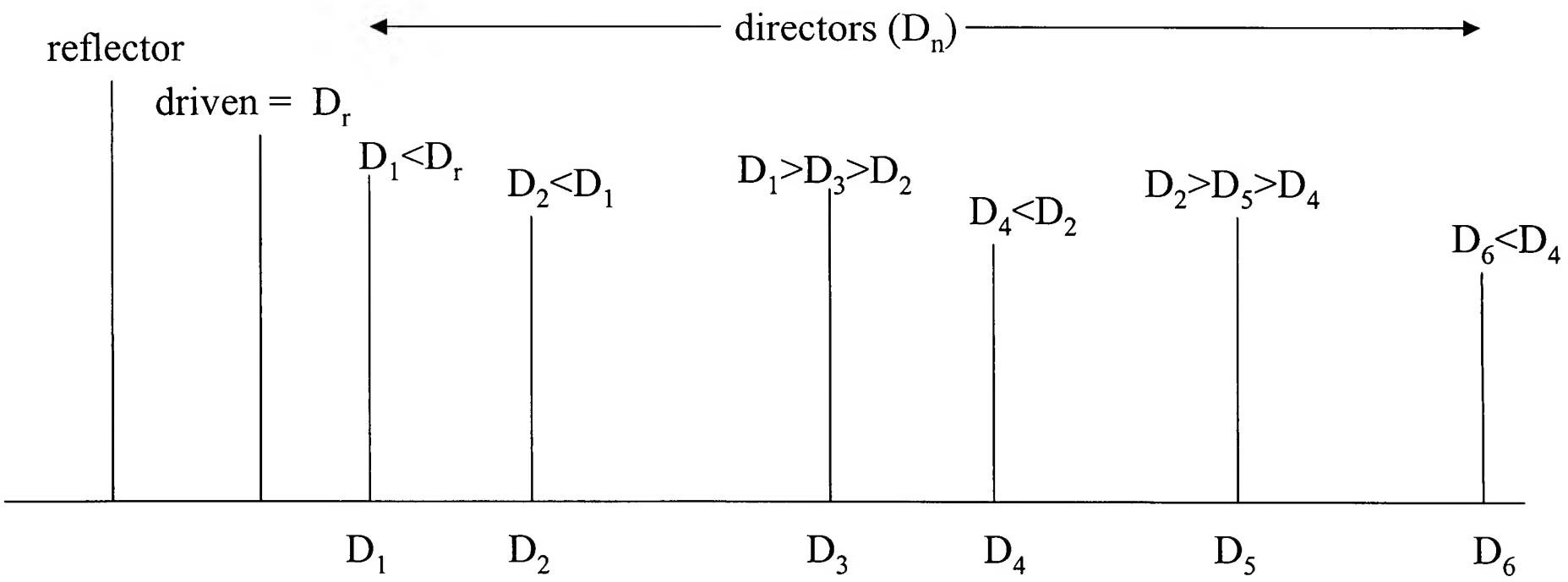
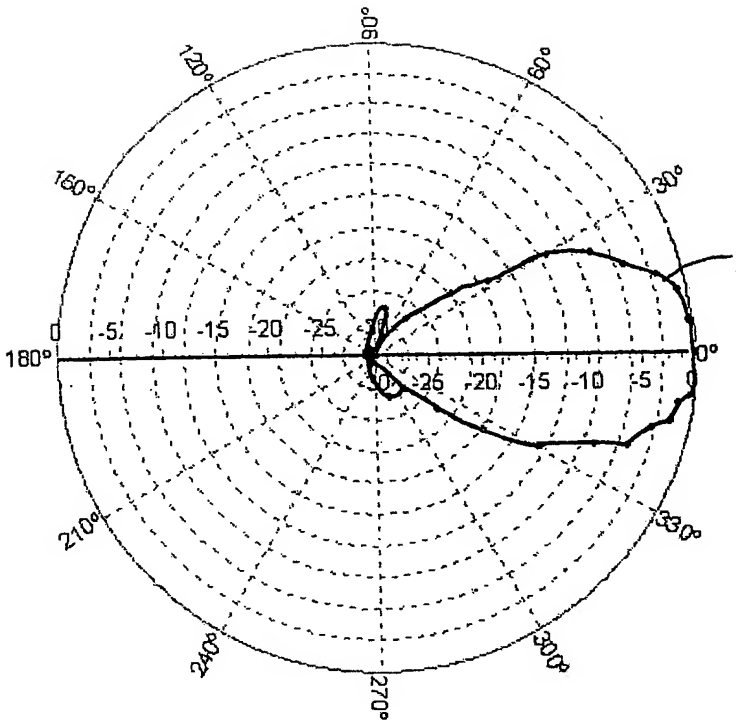

Finalized Extended Ground-Plane Beam Antenna
•2400-2500 MHz
•17 dBi of gain
•Multi-Polarized
•1/16 inch diameter elements
•18 inches in overall length
700
8"x8" reflector plate
Elements:
7/8" 15/16" 13/16"
720
contiguous
x = 1", (1/2 x + y ≥ ¼ λ)
1 13/32"
29/32"
13/16"
27/32
23/32"
3/4"
21/32"
730
740
741
742
743
744
745
D1
D2
D3
D4
D5
D6
721
723
710
722
135° (0°-180°)
¼"
1"
1"
1"
1.5"
3/4"
1.75"
1"
9.75"
750
y = 1"

FIG. 8



For odd > 1:

- the spacing between director elements D_{odd} and D_{odd-1} is greater than the spacing between director elements D_{odd-1} and D_{odd-2}
- the length (D_{odd} - D_{odd-1}) is less than the length ½ (D_{odd-2} - D_{odd-1})
- the spacing between director elements D_{odd} and D_{odd-1} , and D_{odd-2} and D_{odd-1} increase the further the director elements get from the driven element D_r



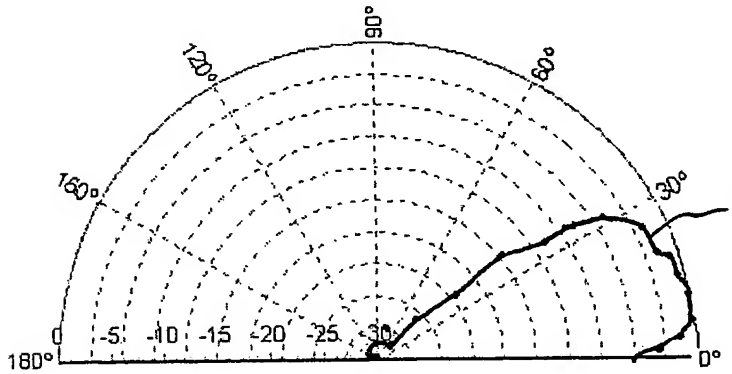
2.4 GHz 18" BEAM 17 dBi

911

Azimuth Coordinate Pattern

910

FIG. 9



920

921

Elevation Coordinate Pattern

FIG. 10A

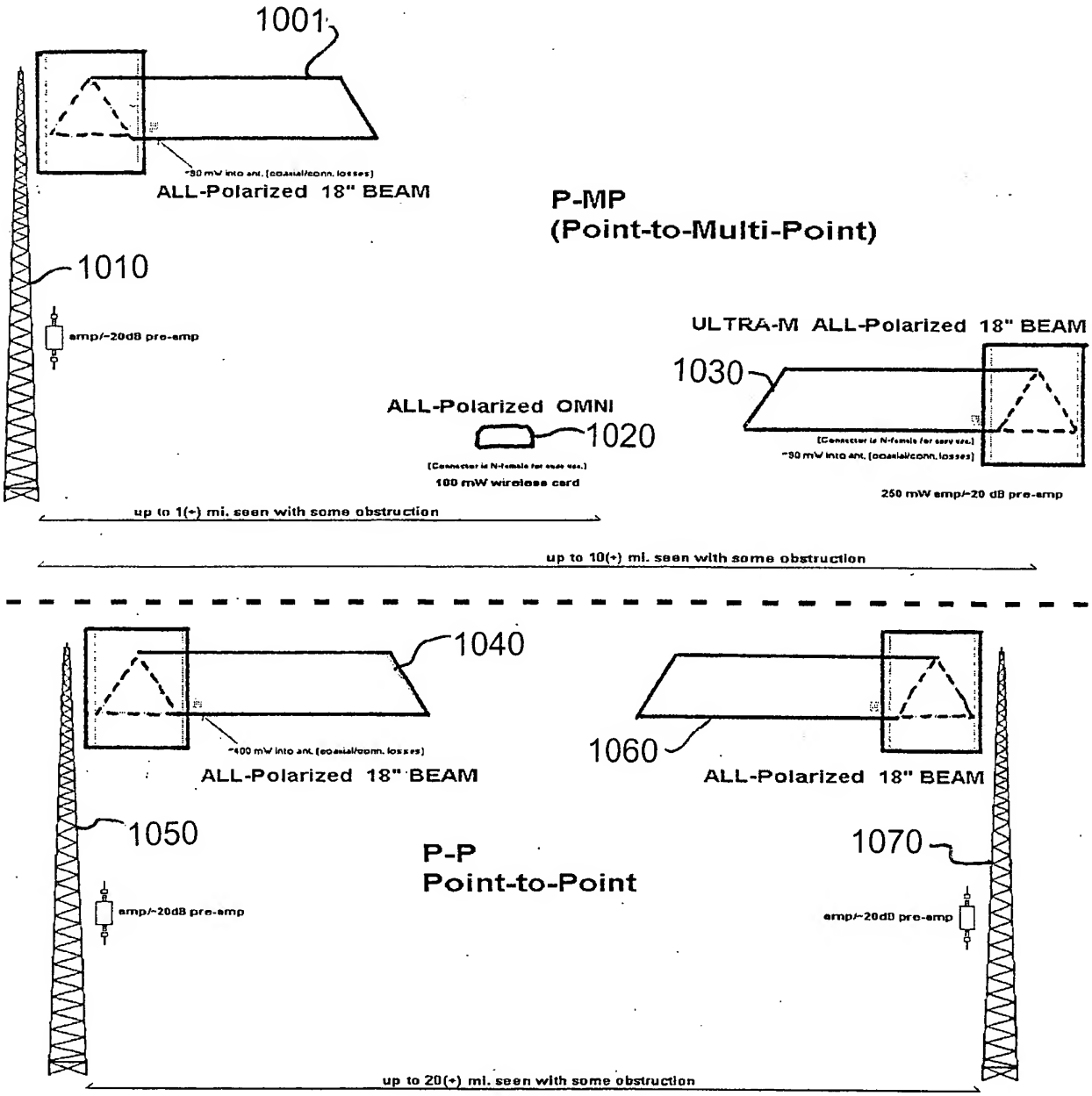


FIG. 10B

FIG. 11

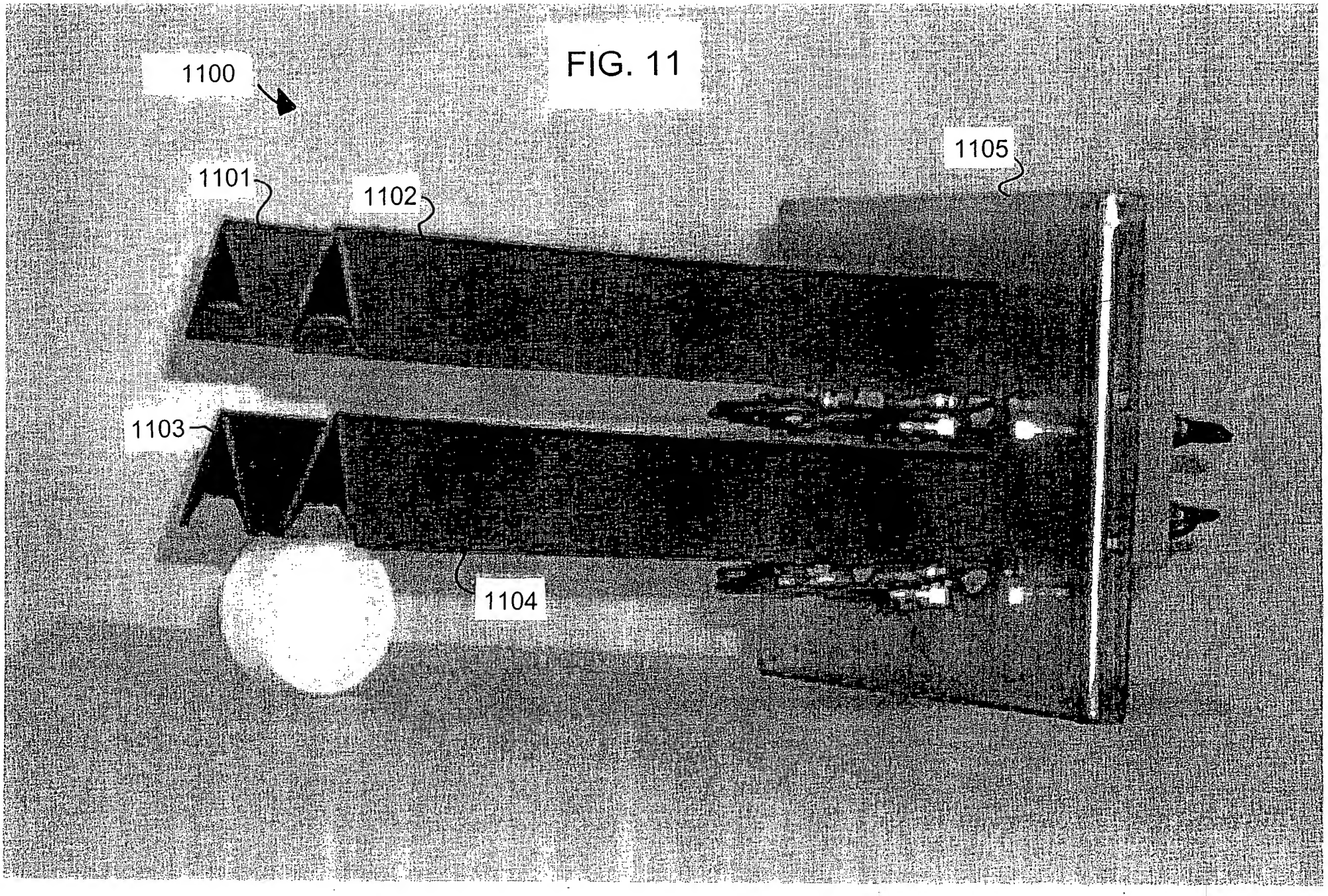
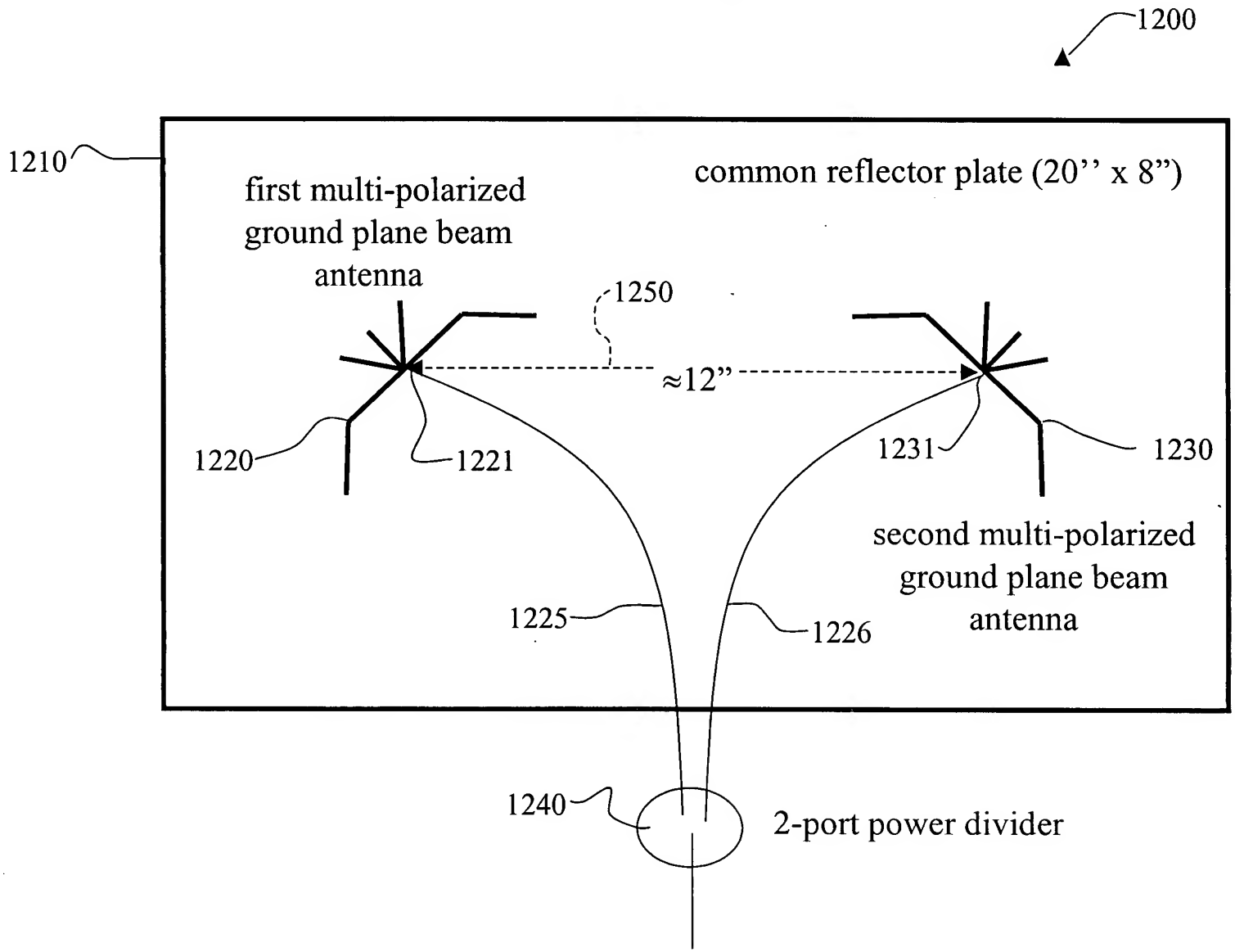


FIG. 12


1200
1210
common reflector plate (20'' x 8")
first multi-polarized ground plane beam antenna
1250
≈12"
1220
1221
1231
1230
second multi-polarized ground plane beam antenna
1225
1226
1240
2-port power divider